EMC TEST REPORT

Project No.	**LBE081646**	**Revision No.**	NONE
Applicant	**Name of organization**	Samsung Electronics Co., Ltd.	
	Address	416 Maetan 3-Dong,Yeongtong-Gu,Suwon-Si, Gyeonggi-Do, 443-742 Korea	
	Date of application	2008.05.16	
EUT Equipment Under Test	**Kind of product**	**LCD Monitor**	
	Model No.	**MG40PS**	
		Variant Model No.	NONE
	New / Alternative / Permissive change information	* New	
	Manufacturer	Samsung Electronics Co., Ltd. 416 Maetan 3-Dong,Yeongtong-Gu,Suwon-Si, Gyeonggi-Do, 443-742 Korea	
Applied Standards		EN55022:1998+A1:2000+A2:2003	
		EN55024:1998+A1:2001+A2:2003	
		EN61000-3-2:2000+A2:2005	
		EN61000-3-3:1995+A1:2001+A2:2005	
Issue date		2008.06.30	

Test result : **Complied**

The equipment under test has found to be compliant with the applied standards.
(Refer to the attached test result for more detail.)

Tested by : Hyun Jeong, Jang

Reviewed by : No Cheon, Park

This report is the test result about the sphere accredited by KOLAS which signed the Mutual Recognition Arrangement of International Laboratory Accreditation Cooperation.
The test results in this report only apply to the tested sample. This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

SAMSUNG

SEC EMC Laboratory
416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, 443-742 Korea
Tel: 82 31 277 7752, Fax: 82 31 277 7753

Table of contents

1. Summary of test results
1.1 Emission
1.2 Immunity

2. General Information
2.1 Test facility
2.2 Accreditation and listing
2.3 EUT Description

3. Test configuration
3.1 Test Peripherals
3.2 EUT operating mode
3.3 Details of Sampling
3.4 Used cable description
3.5 EUT Description
3.6 Description of the EUT exercising method
3.7 Performance Criteria
3.8 Measurement uncertainty
3.9 Measurement uncertainty

4. Result of individual tests
4.1 Conducted disturbance
4.2 Radiated disturbance
4.3 Harmonics current
4.4 Voltage fluctuation & Flicker
4.5 Electrostatic discharge
4.6 Radiated, radio-frequency, electromagnetic field
4.7 Electrical fast transient/burst
4.8 Surge
4.9 Conducted disturbances, induced by radio-frequency fields
4.10 Voltage dips, short interruptions and voltage variations

Appendix – EUT photography

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

1. Summary of test results

1.1 Emission

The EUT has been tested according to the following specifications:

Applied	Test type	Applied standard	Result	Remarks
☒	Conducted Disturbance (Mains Port)	EN55022:1998+A1:2000+A2:2003	Complied	Meets Class B Limit Minimum margin is 6.2dB at 0.391 MHz
☒	Radiated Disturbance		Complied	Meets Class B Limit Minimum margin is 3.3 dB at 512.396 MHz
☒	Harmonics current	EN61000-3-2:2000 +A2:2005	Complied	
☒	Voltage fluctuation & Flicker	EN61000-3-3:1995+A1: 2001+A2:2005	Complied	

1.2 Immunity

Immunity test applied the normative documents of EN55024:1998+A1:2001+A2:2003.
The EUT has been tested according to the following specifications:

Applied	Test type	Applied standard	Performance Criterion	
			Result	Specification
☒	Electrostatic discharge	EN61000-4-2:1995	A☒ B☐ C☐	**B**
☒	Radiated, radio-frequency, electromagnetic field	EN61000-4-3:1995	A☒ B☐ C☐	**A**
☒	Electrical fast transient/burst	EN61000-4-4:1995	A☒ B☐ C☐	**B**
☒	Surge	EN61000-4-5:1995	A☒ B☐ C☐	**B**
☒	Radio-frequency conducted	EN61000-4-6:1996	A☒ B☐ C☐	**A**
☒	Voltage dips, short interruptions and voltage variations	EN61000-4-11:1994	A☒ B☐ C☐	B : > 95 % 0.5 Reduction C : 30 % 25 Reduction C : > 95 % 250 Reduction
			A☒ B☐ C☐	
			A☐ B☒ C☐	
☐	Power-frequency magnetic field	EN61000-4-8:1993	A☐ B☐ C☐	**A**

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

2. General Information

2.1 Test facility

The SEC EMC Laboratory is located on Samsung Electronics Co., Ltd. at 416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, South Korea.
All testing are performed in Semi-anechoic chambers conforming to the site attenuation Characteristics defined by ANSI C63.4, CISPR 22, 16-1 and 16-2. and Shielded rooms.

The SEC EMC Laboratory is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:2005.

2.2 Accreditation and listing

Laboratory Qualifications		Remarks
	KOLAS(Korea Laboratory Accreditation Scheme)	Accredited : 124
	Radio Research Laboratory	Accredited : KR0004
	FCC(Federal Communications Commission)	Accredited : KR0004
	National Voluntary Laboratory Accreditation Program	Lab Code: 200623-0
	Norges Elektriske Materiellkontroll	Accredited : ELA 195
	VCCI (Voluntary Control Council for Interference by Information Technology Equipment)	C-2421,R-2224
	China Quality Certification Center	5-053, 5-054
	TUV Rhineland	H9354285
	GOST(GOSTSTANDART)	ROSTEST
	Elektrotechnicky Zkusebni Ustav	Reg. No.: 001
Industry Canada	IC(Industry Canada)	Assigned Code: 5871

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

3. Test Setup configuration

3.1 Test Peripherals

The cables used for these peripherals are either permanently attached by the peripheral manufacturer or coupled with an assigned cable as defined below.
The following is a listing of the EUT and peripherals utilized during the performance of EMC test:

Description	Model No.	Serial No.	Manufacturer	Note
LCD Monitor	MG40PS	-	Samsung	EUT
PC	DM-V4	Y95998AX800011Z	Samsung	-
Printer	ML-1610	BC27BKBL500801F	Samsung	-
USB Keyboard	SEM-DT35US	5B004314	Samsung	-
PS/2 Mouse	SMOP5000WX-UAG	06060003357	CHIC CORP	-

3.2 EUT operating mode

To achieve compliance applied standard specification, the following mode(s) were made during compliance testing:

Operating Mode 1	PC Video In(Analog)
Operating Mode 2	DVI Input(Digital)
Operating Mode 3	DVI to HDMI connected

3.3 Details of Sampling

Customer selected, single unit.

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

3.4 Used cable description

The EUT is configured, installed, arranged and operated in a manner consistent with typical applications. Interface cables/loads/devices are connected to at least one of each type of interface port of the EUT, and where practical, each cable shall be terminated in a device typical of actual usage. The type(s) of interconnecting cables to be used and the interface port (of the EUT) to which these were connected;

No	Connect Cable	Length [m]	Shielded [Y/N]	Remark
1	Power	1.8	N	EUT
2	Power	1.8	N	PC
3	Power	1.8	N	Printer
4	DVI Video Input	1.5	N	-
5	PC Video Input	1.5	N	-
6	BNC Audio Input	1.2	N	-
7	BNC Video output	1.2	N	-
8	USB (Keyboard)	1.5	N	-
9	PS/2 (Mouse)	1.5	N	-
10	PC Audio In	1.5	N	-
11	RS-232C In	1.2	N	-
12	RS-232C Out	1.2	N	-
13	audio In	1.5	N	-
14	AV out	1.5	N	-

3.5 EUT Description

The following features describe EUT represented by this report:

Items	Description
Optimum Resoultion	1 360 x 768 @ 60Hz
Maximum Resolution	1 360 x 768 @ 60Hz
Horizontal Frequency(kHz)	30~81KHz
Vertical Frequency(Hz)	50~85Hz

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

3.6 Description of the EUT exercising method

The EUT exercise program used during EMI and Immunity (EMS) testing was the SEC EMC Laboratory standardized test program for MS Windows. The program repetitively sends a screen of H - Character to the display.
Connect video output of computer on EUT's PC IN(D-sub)port and scrolled H – character continuously on EUT's screen.
Also, when EUT has loudspeaker, it was regenerative through EUT's audio input reproducing "digital white noise" by MS Windows Media player in computer.

3.7 Performance Criteria

Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion B

After the test, the equipment shall continue to operate as intended without operator intervention.
No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.
During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.
If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.
Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

3.8 Measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus: (According to CISPR 16-4 and UKAS Lab 34.)

3.8.1 Emission

Test type		Measurement uncertainty (C.L. 95 %, k = 2)
Conducted disturbance		± 2.8 dB
Radiated Disturbance	Horizontal	± 4.82 dB
	Vertical	± 5.42 dB

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4. Results of individual test

4.1 Conducted disturbance

Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration. The EUT measured in accordance with the methods described in Clause 9.

Limits for conducted disturbance at the mains ports of class A ITE

Frequency range Limits MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	79	66
0,50 to 30	73	60
NOTE The lower limit shall apply at the transition frequency		

Limits for conducted disturbance at the mains ports of class B ITE

Frequency range Limits MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50
NOTE 1 The lower limit shall apply at the transition frequency NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

4.1.1 Test instrumentation

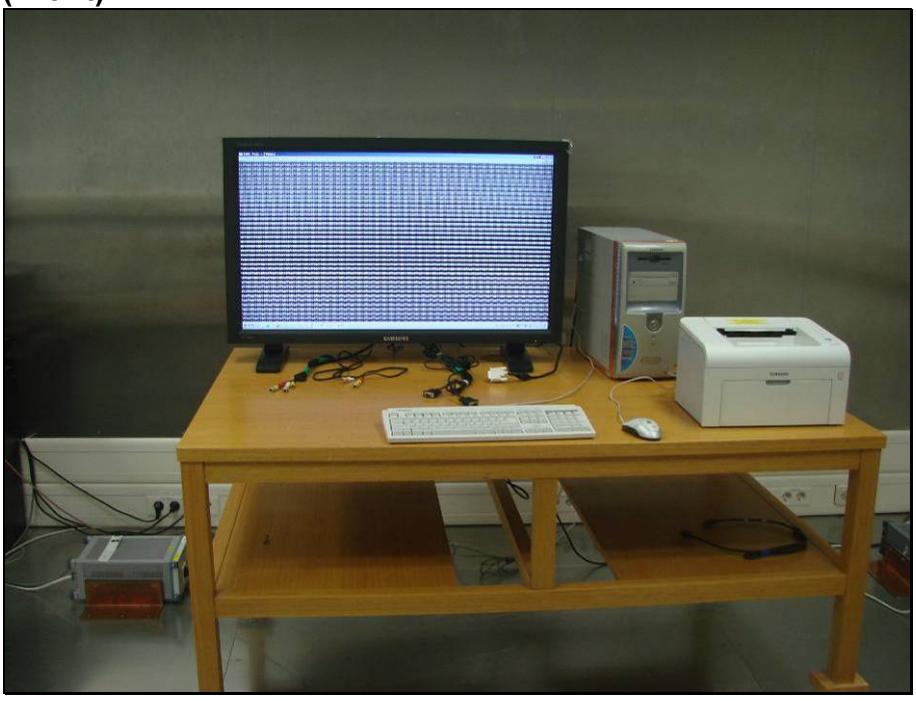
Test instrumentation used in the Conducted disturbance test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Test Software	EMC 32	R&S	Ver. 4.40.0	N/A	N/A
Measuring receiver	ESCI	R&S	100368	2008-06-11	12
Artificial mains network	ENV216	R&S	100116	2007-09-13	12

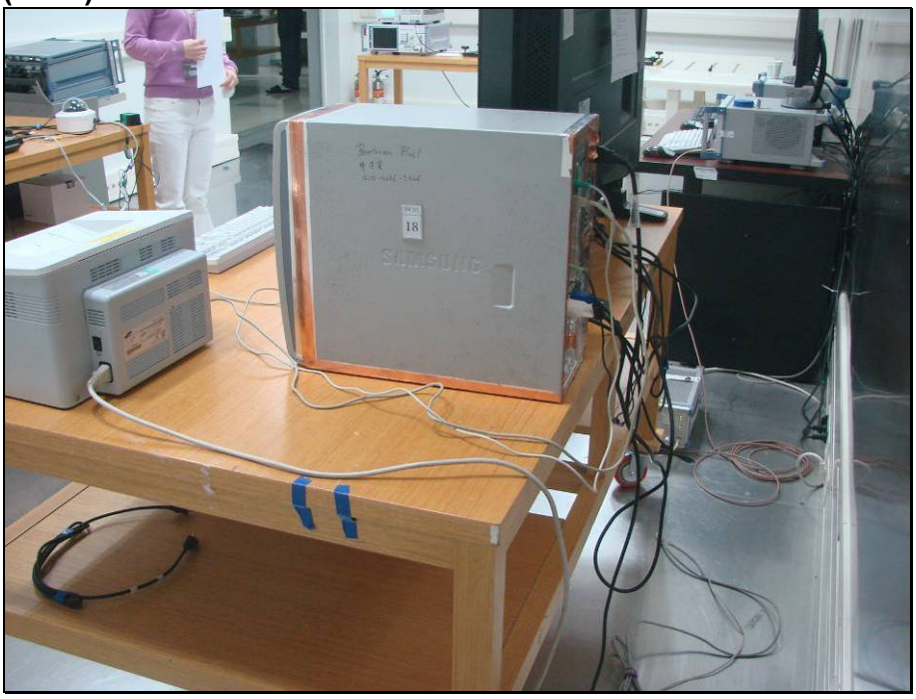
This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.1.2 Photograph of the test Configuration

(Front)



(Rear)



This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.1.3 Test results

Operating condition	PC Video In(Analog)			
Test date	2008-05-29	**Test engineer**	Hyun Jeong, Jang	
Climate condition	**Ambient temperature**	25.2 ℃	**Relative humidity**	46 %
	Atmospheric pressure	100.7 kPa		
Test place	Shielded Room #1			
Note	* QP : Quasi-peak, AV: Average * Result = Level(QP or AV) + Corr. (LISN Insertion loss + Cable loss – Amplifier Gain) * Margin = Limit - Level			

Hardware Setup: Voltage with ENV 2-Line-LISN - [EMI conducted]

Subrange 1

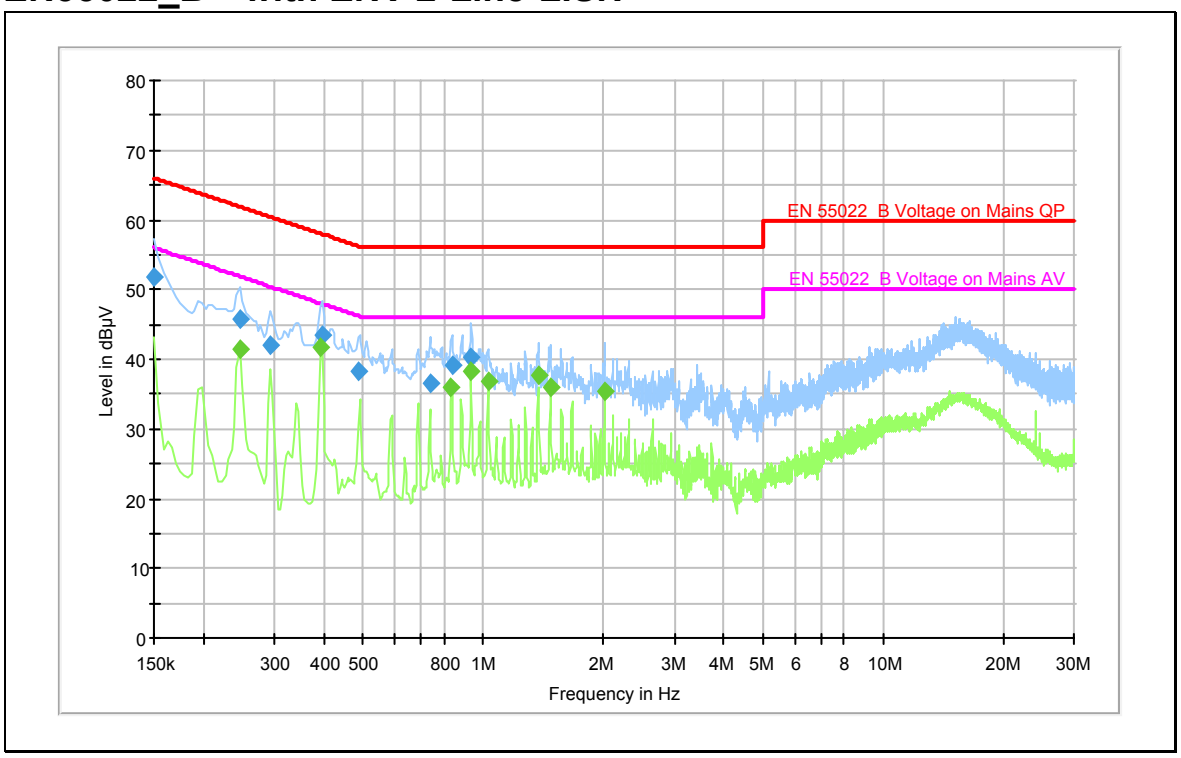
Frequency Range:	150kHz - 30MHz
Receiver:	ESCI 3
Transducer:	ENV216 / Receiver-2-Line-LISN ENV216

Scan Setup: EN55022_B_ENV 2-Line-LISN fin [EMI conducted]

Hardware Setup:	Voltage with ENV 2-Line-LISN
Level Unit:	dB μ V

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150kHz - 30MHz	QuasiPeak; Average	9kHz	15s	ESCI 3

EN55022_B with ENV 2-Line-LISN



This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

Final Measurement Detector 1

Frequency (MHz)	Quasi Peak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150 000	51.7	L1	9.6	14.3	66.0
0.245 500	45.8	L1	9.6	16.1	61.9
0.293 500	41.9	L1	9.6	18.5	60.4
0.393 500	43.4	N	9.6	14.6	58.0
0.488 500	38.4	N	9.6	17.8	56.2
0.736 500	36.5	L1	9.7	19.5	56.0
0.834 500	39.1	L1	9.7	16.9	56.0
0.932 500	40.2	N	9.7	15.8	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.245 500	41.4	L1	9.6	10.5	51.9
0.392 500	41.8	N	9.6	6.2	48.0
0.832 500	36.0	N	9.7	10.0	46.0
0.931 500	38.2	N	9.7	7.8	46.0
1.028 500	37.0	N	9.7	9.0	46.0
1.372 500	37.6	N	9.7	8.4	46.0
1.470 500	36.0	N	9.7	10.0	46.0
2.009 500	35.4	N	9.7	10.6	46.0

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

Operating condition	DVI Input(Digital)					
Test date	2008-05-29		**Test engineer**		Hyun Jeong, Jang	
Climate condition	**Ambient temperature**	24.1 ℃	**Relative humidity**	40 %	**Atmospheric pressure**	100.7 kPa
Test place	Shielded Room #1					
Note	* QP : Quasi-peak, AV: Average * Result = Level(QP or AV) + Corr. (LISN Insertion loss + Cable loss – Amplifier Gain) * Margin = Limit - Level					

Hardware Setup: Voltage with ENV 2-Line-LISN - [EMI conducted]

Subrange 1

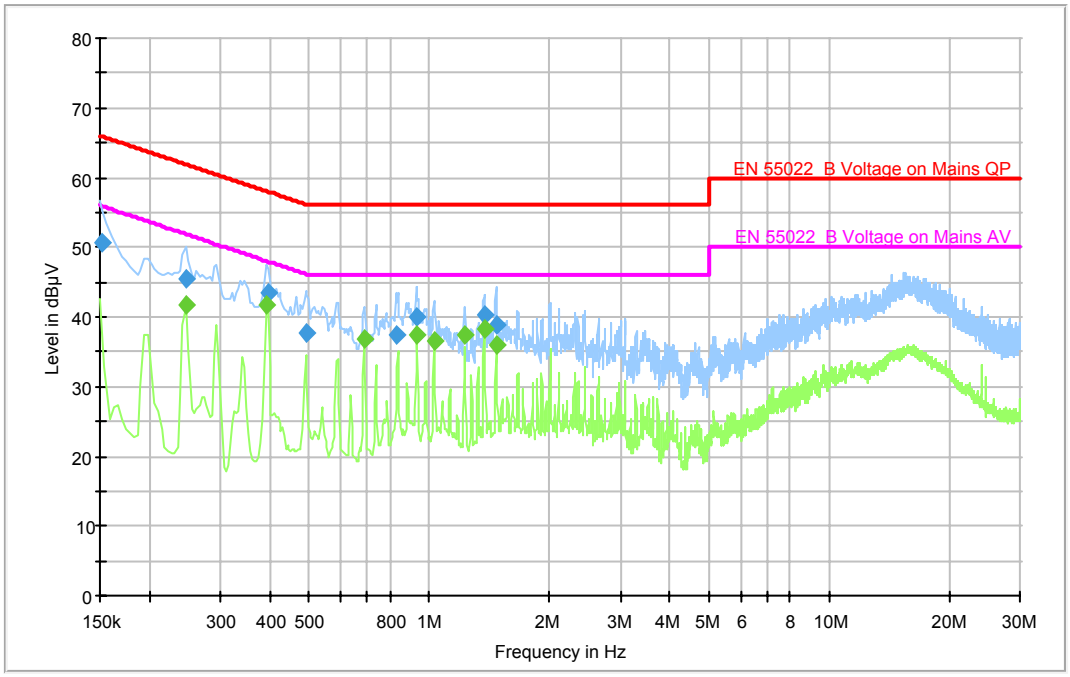
Frequency Range:	150kHz - 30MHz
Receiver:	ESCI 3
Transducer:	ENV216 / Receiver-2-Line-LISN ENV216

Scan Setup: EN55022_B_ENV 2-Line-LISN fin [EMI conducted]

Hardware Setup:	Voltage with ENV 2-Line-LISN
Level Unit:	dB μ V

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150kHz - 30MHz	QuasiPeak; Average	9kHz	15s	ESCI 3

EN55022_B with ENV 2-Line-LISN



This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

Final Measurement Detector 1

Frequency (MHz)	Quasi Peak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.151 000	50.6	L1	9.6	15.4	65.9
0.245 500	45.5	L1	9.6	16.4	61.9
0.393 500	43.4	N	9.6	14.6	58.0
0.493 500	37.8	L1	9.6	18.3	56.1
0.830 500	37.3	L1	9.7	18.7	56.0
0.931 500	39.9	N	9.7	16.1	56.0
1.373 500	40.3	L1	9.7	15.7	56.0
1.468 500	38.8	L1	9.7	17.2	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.245 500	41.6	L1	9.6	10.3	51.9
0.392 500	41.8	N	9.6	6.2	48.0
0.686 500	36.8	N	9.6	9.2	46.0
0.930 500	37.5	N	9.7	8.5	46.0
1.029 500	36.6	L1	9.7	9.4	46.0
1.225 500	37.3	N	9.7	8.7	46.0
1.372 500	38.2	N	9.7	7.8	46.0
1.469 500	36.0	N	9.7	10.0	46.0

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

Operating condition	DVI to HDMI connected					
Test date	2008-05-29		**Test engineer**		Hyun Jeong, Jang	
Climate condition	**Ambient temperature**	24.1 ℃	**Relative humidity**	40 %	**Atmospheric pressure**	100.7 kPa
Test place	Shielded Room #1					
Note	* QP : Quasi-peak, AV: Average * Result = Level(QP or AV) + Corr. (LISN Insertion loss + Cable loss – Amplifier Gain) * Margin = Limit - Level					

Hardware Setup: Voltage with ENV 2-Line-LISN - [EMI conducted]

Subrange 1

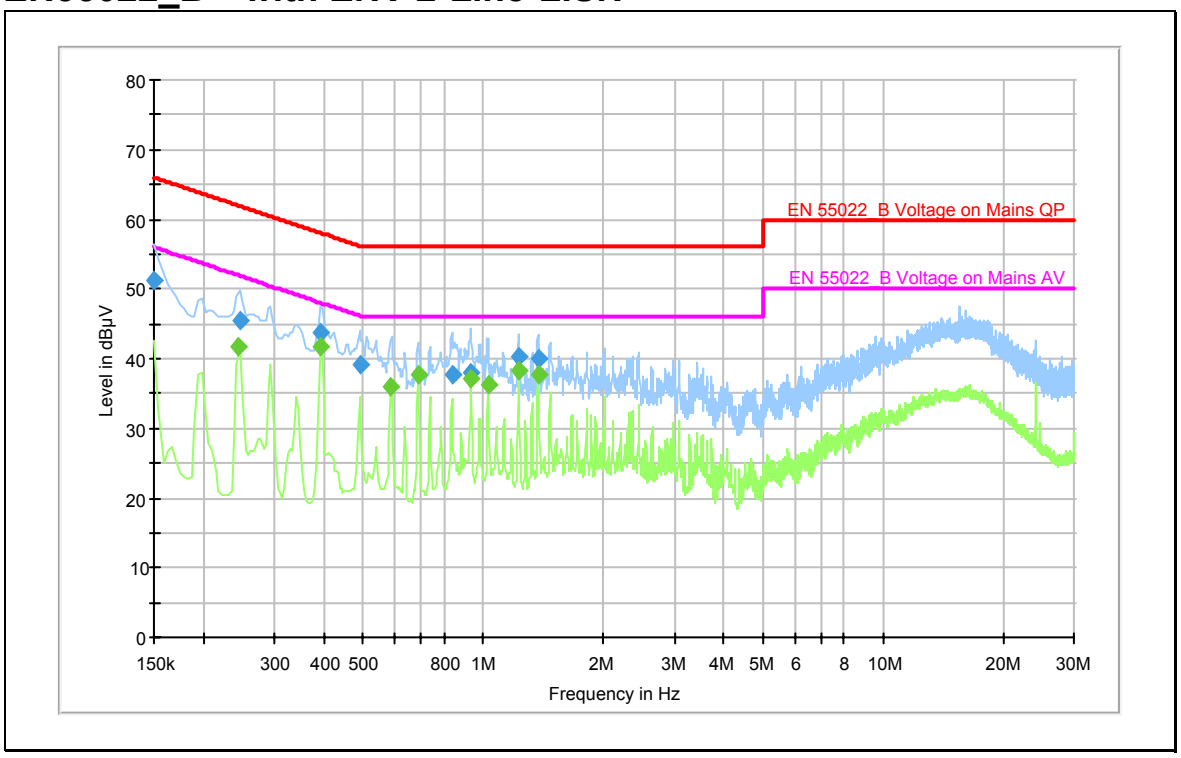
Frequency Range:	150kHz - 30MHz
Receiver:	ESCI 3
Transducer:	ENV216 / Receiver-2-Line-LISN ENV216

Scan Setup: EN55022_B_ENV 2-Line-LISN fin [EMI conducted]

Hardware Setup:	Voltage with ENV 2-Line-LISN
Level Unit:	dB μ V

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150kHz - 30MHz	QuasiPeak; Average	9kHz	15s	ESCI 3

EN55022_B with ENV 2-Line-LISN



This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

Final Measurement Detector 1

Frequency (MHz)	Quasi Peak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150 000	51.2	L1	9.6	14.8	66.0
0.245 500	45.4	L1	9.6	16.5	61.9
0.390 500	43.7	N	9.6	14.3	58.1
0.491 500	39.2	L1	9.6	16.9	56.1
0.835 500	37.8	N	9.7	18.2	56.0
0.926 500	38.0	L1	9.7	18.0	56.0
1.226 500	40.3	N	9.7	15.7	56.0
1.374 500	40.0	L1	9.7	16.0	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.244 500	41.7	L1	9.6	10.3	51.9
0.391 500	41.9	N	9.6	6.2	48.0
0.588 500	36.1	N	9.6	9.9	46.0
0.685 500	37.6	N	9.6	8.4	46.0
0.930 500	37.1	N	9.7	8.9	46.0
1.028 500	36.4	N	9.7	9.6	46.0
1.225 500	38.2	N	9.7	7.8	46.0
1.371 500	37.7	L1	9.7	8.3	46.0

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.2 Radiated disturbance

Of those disturbances above (*L* - 20dB), where *L* is the limit level in logarithmic units, record at least the disturbance levels and the frequencies of the six highest disturbances.
The following data lists the significant emission frequencies, measured levels, correction factors (for antenna and cables), orientation of table, polarization and height of antenna, the corrected reading, the limit, and the amount of margin. All measurements were taken utilizing quasi-peak detection unless stated otherwise. Measurements were performed at an antenna to EUT distance of 10 meters and elevated between 1 and 4 meters. Both vertical and horizontal antenna polarizations were measured.

Limits for radiated disturbance of ITE at a measuring distance of 10 m

Frequency range Limits MHz	Quasi-peak Limits dB dB(μV/m)	
	Class A	Class B
30 to 230	40	30
230 to 1000	47	37
NOTE 1 The lower limit shall apply at the transition frequency NOTE 2 Additional provisions may be required for cases where interference occurs.		

4.2.1 Test instrumentation

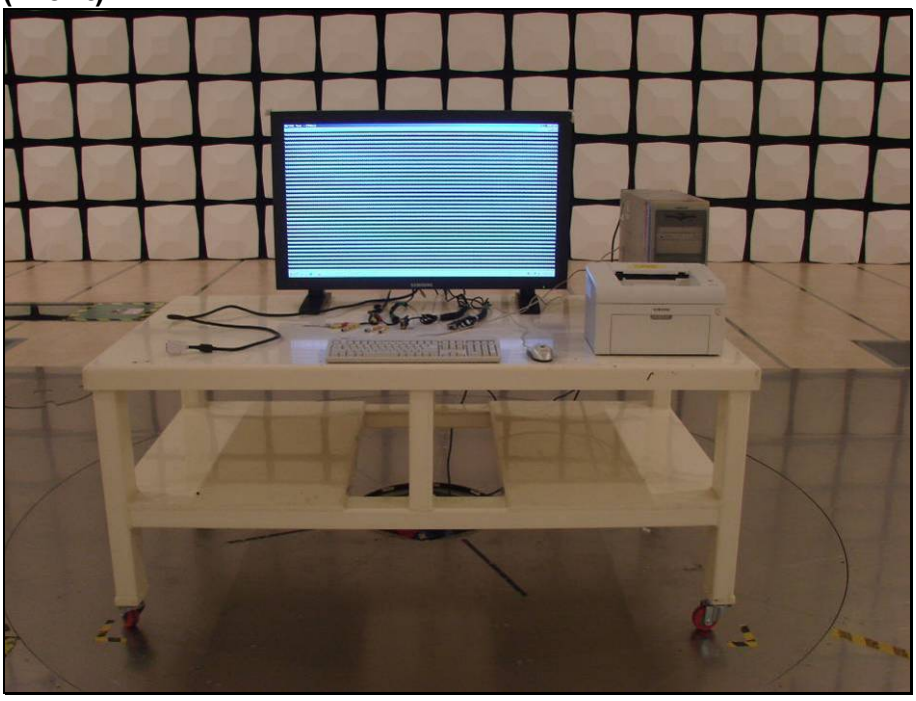
Test instrumentation used in the Radiated disturbance was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
EMI Test Receiver	ESIB-26	R&S	832692/002	2008-03-18	12
EMI Test Receiver	ESIB-26	R&S	100290	2008-03-27	12
Ant. Mast	MA4000	inn-co	-	N/A	N/A
Ant. Mast	MA4000	inn-co	-	N/A	N/A
Mast Controller	CO2000	inn-co	-	N/A	N/A
Amplifier	310N	SONOMA	251674	2008-03-13	12
Amplifier	310N	SONOMA	186465	2008-04-09	12
RF selector	NS4900	inn-co	-	N/A	N/A
RF selector	NS4900	inn-co	-	N/A	N/A
Bi-log Antenna	CBL6112D	SCHAFFNER	22248	2007-10-18	24
Bi-log Antenna	CBL6112D	SCHAFFNER	22603	2007-04-02	24

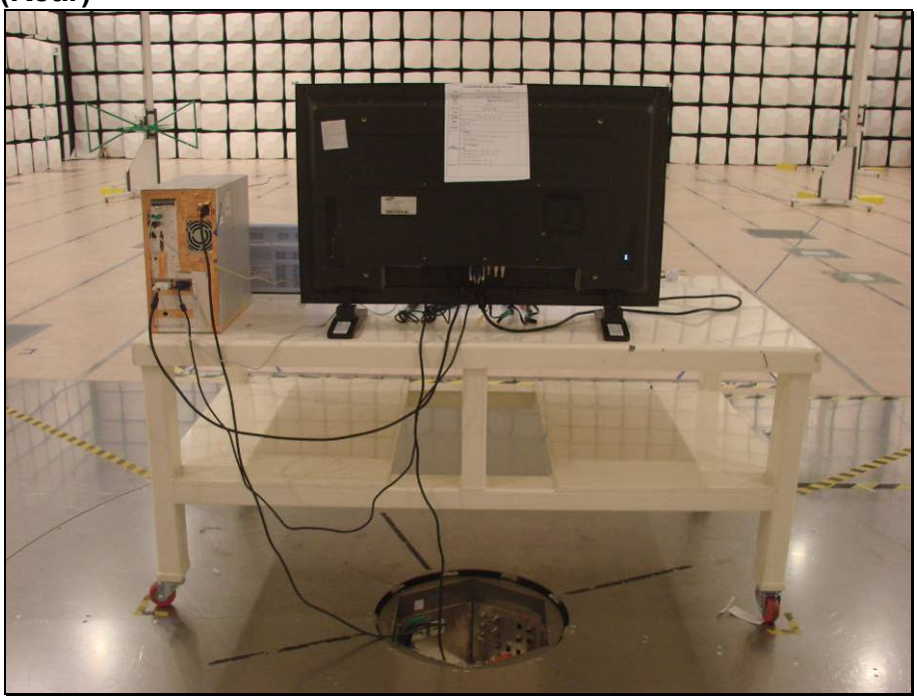
This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.2.2 Photograph of the test Configuration

(Front)



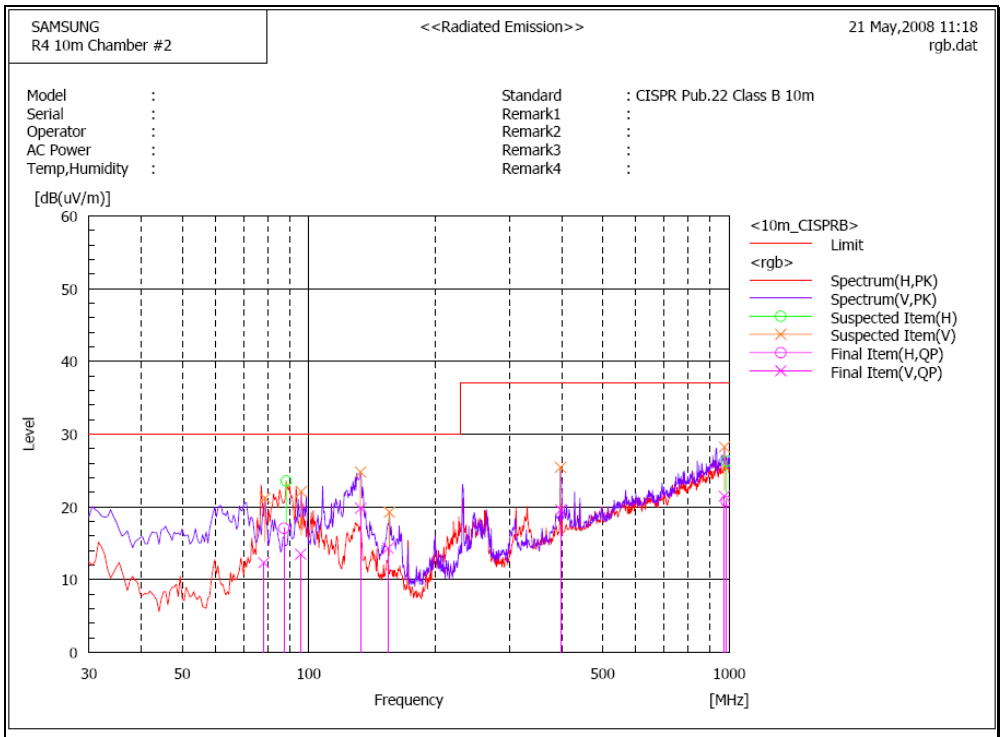
(Rear)



This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.2.3 Test results

Operating condition	PC Video In(Analog)			
Test date	2008-06-19	**Test engineer**	Hyun Jeong, Jang	
Climate condition	**Ambient temperature**	23.4 ℃	**Relative humidity**	42%
	Atmospheric pressure	101.0 kPa		
Test place	10m Semi-Anechoic Chamber #2			
Note	* Receiving antenna mode : Horizontal, Vertical * Test distance : 10 m (RF Semi Anechoic Chamber) * Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain) * Margin = Limit – Result			



Final Result

--- Horizontal Polarization (QP)---

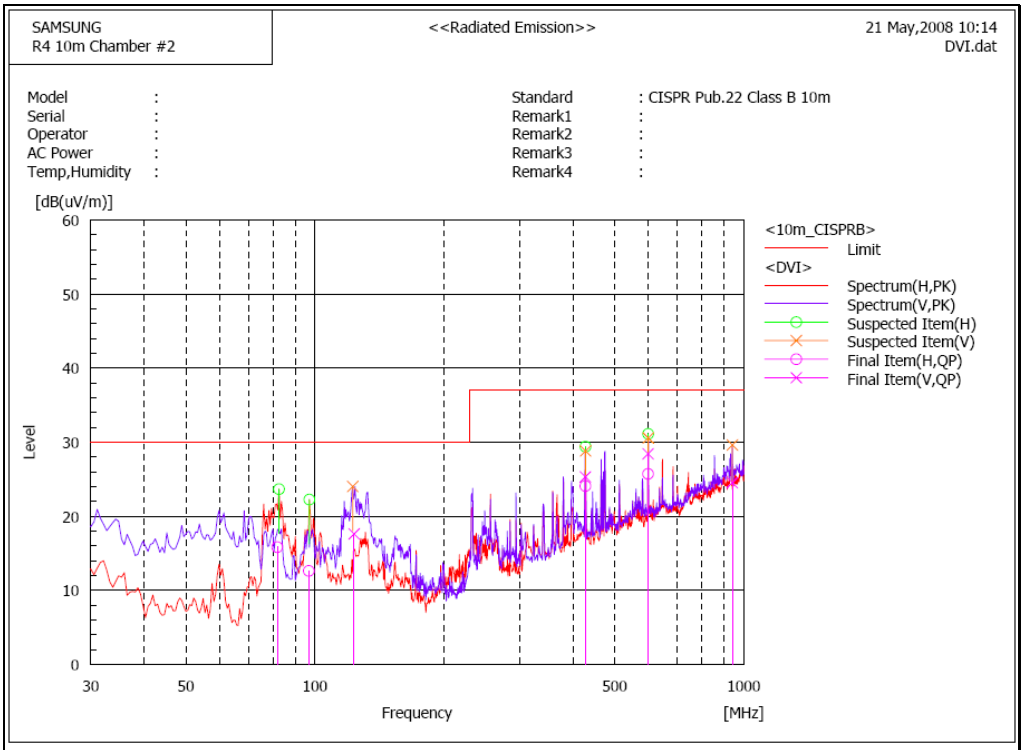
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Remark
1	87.287	38.6	-21.5	17.1	30.0	12.9	
2	985.109	22.6	-1.8	20.8	37.0	16.2	

--- Vertical Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Remark
1	78.213	34.9	-22.6	12.3	30.0	17.7	
2	95.625	32.4	-18.9	13.5	30.0	16.5	
3	132.895	36.3	-16.5	19.8	30.0	10.2	
4	154.468	33.0	-18.7	14.3	30.0	15.7	
5	397.572	30.4	-10.8	19.6	37.0	17.4	
6	973.396	22.5	-1.0	21.5	37.0	15.5	

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

Operating condition	DVI Input(Digital)			
Test date	2008-06-19	**Test engineer**	Hyun Jeong, Jang	
Climate condition	**Ambient temperature**	23.4 ℃	**Relative humidity**	42%
	Atmospheric pressure	101.0 kPa		
Test place	10m Semi-Anechoic Chamber #2			
Note	* Receiving antenna mode : Horizontal, Vertical * Test distance : 10 m (RF Semi Anechoic Chamber) * Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain) * Margin = Limit – Result			



Final Result

--- Horizontal Polarization (QP)---

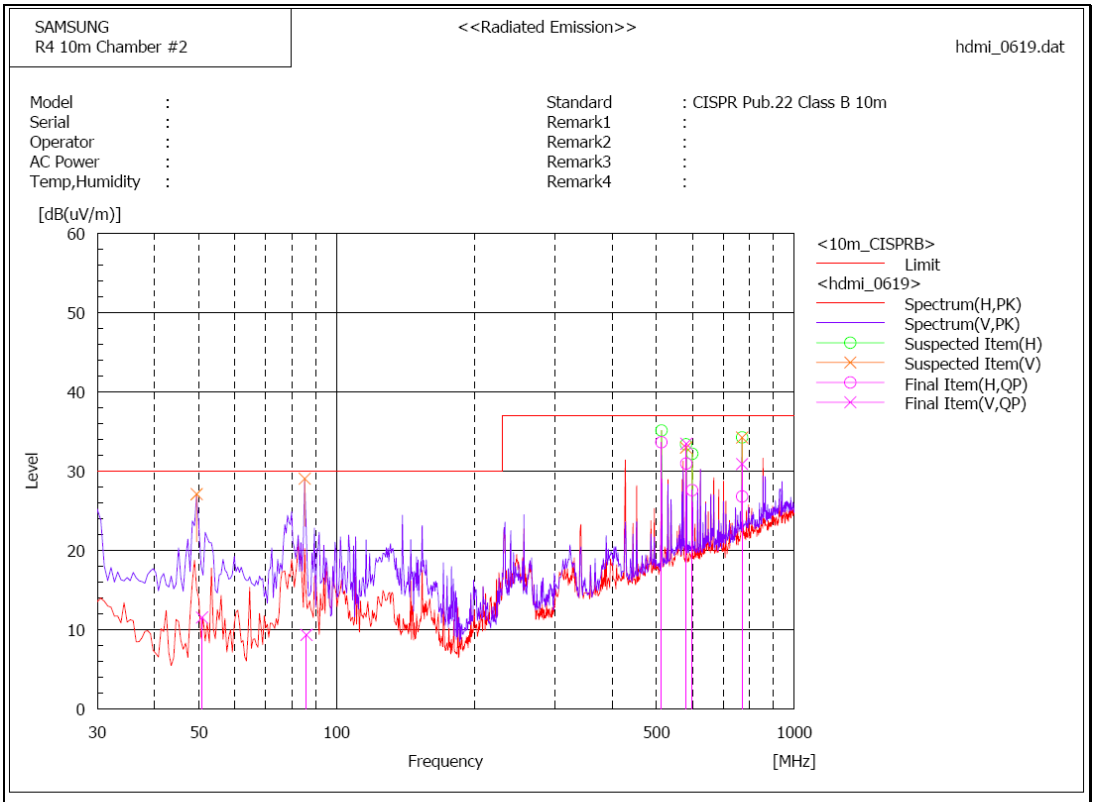
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Remark
1	81.714	38.4	-22.6	15.8	30.0	14.2	
2	96.810	32.4	-19.8	12.6	30.0	17.4	
3	427.536	34.4	-10.3	24.1	37.0	12.9	
4	598.524	33.5	-7.8	25.7	37.0	11.3	

--- Vertical Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Remark
1	123.437	34.1	-16.5	17.6	30.0	12.4	
2	427.508	35.2	-9.9	25.3	37.0	11.7	
3	598.468	35.3	-6.9	28.4	37.0	8.6	
4	940.584	26.2	-1.7	24.5	37.0	12.5	

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

Operating condition	DVI to HDMI connected			
Test date	2008-06-19	**Test engineer**	Hyun Jeong, Jang	
Climate condition	**Ambient temperature**	23.4 ℃	**Relative humidity**	42%
	Atmospheric pressure	101.0 kPa		
Test place	10m Semi-Anechoic Chamber #2			
Note	* Receiving antenna mode : Horizontal, Vertical * Test distance : 10 m (RF Semi Anechoic Chamber) * Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain) * Margin = Limit – Result			



Final Result

--- Horizontal Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Remark
1	512.995	42.7	-9.0	33.7	37.0	3.3	
2	581.396	39.0	-8.0	31.0	37.0	6.0	
3	598.524	35.4	-7.8	27.6	37.0	9.4	
4	769.498	32.2	-5.4	26.8	37.0	10.2	

--- Vertical Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Remark
1	85.918	30.5	-21.1	9.4	30.0	20.6	
2	50.818	33.9	-22.4	11.5	30.0	18.5	
3	581.396	40.6	-7.1	33.5	37.0	3.5	
4	769.484	35.3	-4.4	30.9	37.0	6.1	

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.3 Harmonics current

The EUT operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
The power consumption, steady state harmonic currents were measured in the tested operating mode(s).
The EUT measured in accordance with the test conditions described in Annex C (C.10).

Limits for Class D equipment

Harmonic order n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
13 ≤ n ≤ 39 (odd harmonics only)	3.85/n	See Table 1

4.3.1 Test instrumentation

Test instrumentation used in the Harmonics current test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Power Analyzer	PM6000	Voltech	100006700167	2007-10-12	12
IEC Network	555	ZIMMER	IB10/9466	N/A	N/A
Test Software	IEC1000-3	Voltech	Ver 3.13.08	N/A	N/A

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.3.2 Photograph of the test Configuration

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.3.3 Test results

Operating condition	PC Video In(Analog)			
Test date	2008-05-31	**Test engineer**	Hyun Jeong, Jang	
Climate condition	**Ambient temperature**	24.2 ℃	**Relative humidity**	40 %
	Atmospheric pressure	100.5 kPa		
Test place	Shielded Room #3			

Product:	MONITOR	2008 May 30 4:58pm
Serial no:	None	Page 1 of 1
Description:		
Test Date:	2008 May 30 4:33pm	
Result Name:	HAR_PC	
Type of Test:	EN61000:2006 Harmonics inc. interharmonics to EN61000-4-7	
Limits:	Class D	
Power Analyzer:	Voltech PM6000 v1.18.05RC3 s/n 100006700167	
AC Source:	Mains / Manual Source	

Harmonic Results Against Chosen Limits:	**Notes:**
PASS	Voltage Crest Factor outside permitted limits

Test Parameter Details	**User Entered**	**Measured**
Operating Frequency:	50	49.9840
Operating Voltage:	230	230.5914
Specified Power:	170.0000	158.5691
Fundamental Current:	0.0000	0.6955
Power Factor:	0.0000	0.9751
Average Input Current:		0.7048
Maximum POHC:		0.0041
POHC Limit:		0.0731
Maximum THC:		0.1179
Minimum Power:	75	
Class Multiplier:	1.0000	
Test Duration:	00:02:30	

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

Product:	MONITOR	2008 May 30 4:58pm
Serial no:	None	Page 1 of 1
Description:		
Result Name:	HAR_PC	
Voltech IEC61000-3 Windows Software 1.08.03RC1		Test Date: 2008 May 30 4:33pm
Type of Test:	Fluctuating Harmonics Test - Worst Case Table (2006)	
Power Analyzer:	Voltech PM6000 v1.18.05RC3 s/n 100006700167	
AC Source:	Mains / Manual Source	
Overall Result: **PASS**	Notes: Voltage Crest Factor outside permitted limits	

Class	Class D
Class Multiplier	1

Harm	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FAIL	Harm	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FAIL
2	None	None	1.134mA		1.248mA		N/A	3	578.0mA	867.0mA	103.7mA	✓ ✓	104.3mA	✓	Pass
4	None	None	0.498mA		0.538mA		N/A	5	323.0mA	484.5mA	48.28mA	✓ ✓	48.51mA	✓	Pass
6	None	None	0.405mA		0.433mA		N/A	7	170.0mA	255.0mA	23.86mA	✓ ✓	24.08mA	✓	Pass
8	None	None	0.238mA		0.354mA		N/A	9	85.00mA	127.5mA	7.222mA	✓ ✓	7.475mA	✓	Pass
10	None	None	0.219mA		0.250mA		N/A	11	59.50mA	89.25mA	3.403mA	✓ ✓	3.519mA	✓	N/A
12	None	None	0.207mA		0.232mA		N/A	13	50.34mA	75.51mA	1.317mA	✓ ✓	1.448mA	✓	N/A
14	None	None	0.194mA		0.216mA		N/A	15	43.63mA	65.44mA	2.136mA	✓ ✓	2.243mA	✓	N/A
16	None	None	0.213mA		0.232mA		N/A	17	38.50mA	57.75mA	3.483mA	✓ ✓	3.504mA	✓	N/A
18	None	None	0.151mA		0.168mA		N/A	19	34.44mA	51.67mA	2.808mA	✓ ✓	2.880mA	✓	N/A
20	None	None	0.152mA		0.171mA		N/A	21	31.16mA	46.75mA	2.081mA	✓ ✓	2.134mA	✓	N/A
22	None	None	0.144mA		0.165mA		N/A	23	28.45mA	42.68mA	1.807mA	✓ ✓	1.865mA	✓	N/A
24	None	None	0.228mA		0.251mA		N/A	25	26.17mA	39.27mA	0.918mA	✓ ✓	0.993mA	✓	N/A
26	None	None	0.165mA		0.183mA		N/A	27	24.24mA	36.36mA	0.673mA	✓ ✓	0.694mA	✓	N/A
28	None	None	0.165mA		0.181mA		N/A	29	22.56mA	33.85mA	1.121mA	✓ ✓	1.148mA	✓	N/A
30	None	None	0.138mA		0.155mA		N/A	31	21.11mA	31.66mA	1.258mA	✓ ✓	1.282mA	✓	N/A
32	None	None	0.151mA		0.168mA		N/A	33	19.83mA	29.75mA	1.365mA	✓ ✓	1.394mA	✓	N/A
34	None	None	0.134mA		0.154mA		N/A	35	18.70mA	28.04mA	1.278mA	✓ ✓	1.310mA	✓	N/A
36	None	None	0.142mA		0.159mA		N/A	37	17.68mA	26.53mA	0.813mA	✓ ✓	0.856mA	✓	N/A
38	None	None	0.157mA		0.183mA		N/A	39	16.78mA	25.17mA	0.534mA	✓ ✓	0.563mA	✓	N/A
40	None	None	0.140mA		0.153mA		N/A								

<L1 : Reading is below limit 1.

<L2 : Reading is below limit 2.

N/A : Harmonic current below 0.6% of rated current or 5mA, whichever is greater, are disregarded.

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

Operating condition	DVI Input(Digital)			
Test date	2008-05-31	**Test engineer**	Hyun Jeong, Jang	
Climate condition	**Ambient temperature**	24.2 ℃	**Relative humidity**	40 %
	Atmospheric pressure	100.5 kPa		
Test place	Shielded Room #3			

Product:	MONITOR	2008 May 30 5:05pm
Serial no:	None	Page 1 of 1
Description:		
Test Date:	2008 May 30 5:00pm	
Result Name:	HAR_DVI	
Type of Test:	EN61000:2006 Harmonics inc. interharmonics to EN61000-4-7	
Limits:	Class D	
Power Analyzer:	Voltech PM6000 v1.18.05RC3 s/n 100006700167	
AC Source:	Mains / Manual Source	

Harmonic Results Against Chosen Limits:

PASS

Notes:

Test Parameter Details	**User Entered**	**Measured**
Operating Frequency:	50	49.9840
Operating Voltage:	230	230.6072
Specified Power:	170.0000	159.0499
Fundamental Current:	0.0000	0.6974
Power Factor:	0.0000	0.9762
Average Input Current:		0.7038
Maximum POHC:		0.0042
POHC Limit:		0.0731
Maximum THC:		0.1197
Minimum Power:	75	
Class Multiplier:	1.0000	
Test Duration:	00:02:30	

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

Product:	MONITOR	2008 May 30 5:05pm
Serial no:	None	Page 1 of 1
Description:		
Result Name:	HAR_DVI	
Voltech IEC61000-3 Windows Software 1.08.03RC1	Test Date:	2008 May 30 5:00pm
Type of Test:	Fluctuating Harmonics Test - Worst Case Table (2006)	
Power Analyzer:	Voltech PM6000 v1.18.05RC3 s/n 100006700167	
AC Source:	Mains / Manual Source	
Overall Result: **PASS**		

Class	Class D
Class Multiplier	1

Harm	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FAIL	Harm	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FAIL
2	None	None	0.667mA		0.739mA		N/A	3	578.0mA	867.0mA	104.7mA	✓ ✓	106.2mA	✓	Pass
4	None	None	0.644mA		0.689mA		N/A	5	323.0mA	484.5mA	48.67mA	✓ ✓	49.20mA	✓	Pass
6	None	None	0.442mA		0.472mA		N/A	7	170.0mA	255.0mA	23.63mA	✓ ✓	24.56mA	✓	Pass
8	None	None	0.276mA		0.385mA		N/A	9	85.00mA	127.5mA	6.928mA	✓ ✓	8.037mA	✓	Pass
10	None	None	0.210mA		0.240mA		N/A	11	59.50mA	89.25mA	3.222mA	✓ ✓	3.730mA	✓	N/A
12	None	None	0.203mA		0.226mA		N/A	13	50.34mA	75.51mA	1.093mA	✓ ✓	1.791mA	✓	N/A
14	None	None	0.168mA		0.187mA		N/A	15	43.63mA	65.44mA	2.285mA	✓ ✓	2.510mA	✓	N/A
16	None	None	0.200mA		0.219mA		N/A	17	38.50mA	57.75mA	3.456mA	✓ ✓	3.507mA	✓	N/A
18	None	None	0.171mA		0.193mA		N/A	19	34.44mA	51.67mA	2.684mA	✓ ✓	3.035mA	✓	N/A
20	None	None	0.156mA		0.172mA		N/A	21	31.16mA	46.75mA	2.000mA	✓ ✓	2.202mA	✓	N/A
22	None	None	0.154mA		0.174mA		N/A	23	28.45mA	42.68mA	1.728mA	✓ ✓	1.896mA	✓	N/A
24	None	None	0.224mA		0.253mA		N/A	25	26.17mA	39.27mA	0.818mA	✓ ✓	1.210mA	✓	N/A
26	None	None	0.157mA		0.177mA		N/A	27	24.24mA	36.36mA	0.660mA	✓ ✓	0.699mA	✓	N/A
28	None	None	0.157mA		0.175mA		N/A	29	22.56mA	33.85mA	1.088mA	✓ ✓	1.140mA	✓	N/A
30	None	None	0.144mA		0.159mA		N/A	31	21.11mA	31.66mA	1.251mA	✓ ✓	1.277mA	✓	N/A
32	None	None	0.160mA		0.182mA		N/A	33	19.83mA	29.75mA	1.373mA	✓ ✓	1.419mA	✓	N/A
34	None	None	0.145mA		0.161mA		N/A	35	18.70mA	28.04mA	1.259mA	✓ ✓	1.314mA	✓	N/A
36	None	None	0.142mA		0.159mA		N/A	37	17.68mA	26.53mA	0.794mA	✓ ✓	0.975mA	✓	N/A
38	None	None	0.149mA		0.163mA		N/A	39	16.78mA	25.17mA	0.559mA	✓ ✓	0.616mA	✓	N/A
40	None	None	0.140mA		0.157mA		N/A								

<L1 : Reading is below limit 1.

<L2 : Reading is below limit 2.

N/A : Harmonic current below 0.6% of rated current or 5mA, whichever is greater, are disregarded.

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

Operating condition	DVI to HDMI connected			
Test date	2008-05-31	**Test engineer**	Hyun Jeong, Jang	
Climate condition	**Ambient temperature**	24.2 ℃	**Relative humidity**	40 %
	Atmospheric pressure	100.5 kPa		
Test place	Shielded Room #3			

Product:	MONITOR	2008 May 30 4:57pm
Serial no:	None	Page 1 of 1
Description:		
Test Date:	2008 May 30 4:40pm	
Result Name:	HAR_HDMI	
Type of Test:	EN61000:2006 Harmonics inc. interharmonics to EN61000-4-7	
Limits:	Class D	
Power Analyzer:	Voltech PM6000 v1.18.05RC3 s/n 100006700167	
AC Source:	Mains / Manual Source	

Harmonic Results Against Chosen Limits:

PASS

Notes:
Voltage Crest Factor outside permitted limits

Test Parameter Details	**User Entered**	**Measured**
Operating Frequency:	50	49.9840
Operating Voltage:	230	230.5843
Specified Power:	170.0000	158.3083
Fundamental Current:	0.0000	0.6943
Power Factor:	0.0000	0.9749
Average Input Current:		0.7035
Maximum POHC:		0.0040
POHC Limit:		0.0731
Maximum THC:		0.1195
Minimum Power:	75	
Class Multiplier:	1.0000	
Test Duration:	00:02:30	

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

Product:	MONITOR	2008 May 30 4:58pm
Serial no:	None	Page 1 of 1
Description:		
Result Name:	HAR_HDMI	
Voltech IEC61000-3 Windows Software 1.08.03RC1		Test Date: 2008 May 30 4:40pm
Type of Test:	Fluctuating Harmonics Test - Worst Case Table (2006)	
Power Analyzer:	Voltech PM6000 v1.18.05RC3 s/n 100006700167	
AC Source:	Mains / Manual Source	
Overall Result: **PASS**	Notes: Voltage Crest Factor outside permitted limits	

Class	Class D
Class Multiplier	1

Harm	Limit 1	Limit 2	Average Reading	<L1	<L2	Max Reading	<L2	Pass FAIL	Harm	Limit 1	Limit 2	Average Reading	<L1	<L2	Max Reading	<L2	Pass FAIL
2	None	None	0.714mA			0.764mA		N/A	3	578.0mA	867.0mA	105.3mA	✓	✓	105.9mA	✓	Pass
4	None	None	0.594mA			0.644mA		N/A	5	323.0mA	484.5mA	48.87mA	✓	✓	49.10mA	✓	Pass
6	None	None	0.577mA			0.608mA		N/A	7	170.0mA	255.0mA	23.47mA	✓	✓	23.79mA	✓	Pass
8	None	None	0.218mA			0.331mA		N/A	9	85.00mA	127.5mA	6.795mA	✓	✓	7.147mA	✓	Pass
10	None	None	0.201mA			0.227mA		N/A	11	59.50mA	89.25mA	3.197mA	✓	✓	3.360mA	✓	N/A
12	None	None	0.219mA			0.242mA		N/A	13	50.34mA	75.51mA	0.998mA	✓	✓	1.208mA	✓	N/A
14	None	None	0.159mA			0.176mA		N/A	15	43.63mA	65.44mA	2.391mA	✓	✓	2.481mA	✓	N/A
16	None	None	0.230mA			0.250mA		N/A	17	38.50mA	57.75mA	3.456mA	✓	✓	3.492mA	✓	N/A
18	None	None	0.173mA			0.190mA		N/A	19	34.44mA	51.67mA	2.628mA	✓	✓	2.754mA	✓	N/A
20	None	None	0.146mA			0.160mA		N/A	21	31.16mA	46.75mA	1.987mA	✓	✓	2.070mA	✓	N/A
22	None	None	0.164mA			0.184mA		N/A	23	28.45mA	42.68mA	1.717mA	✓	✓	1.802mA	✓	N/A
24	None	None	0.233mA			0.251mA		N/A	25	26.17mA	39.27mA	0.760mA	✓	✓	0.870mA	✓	N/A
26	None	None	0.156mA			0.172mA		N/A	27	24.24mA	36.36mA	0.672mA	✓	✓	0.691mA	✓	N/A
28	None	None	0.171mA			0.191mA		N/A	29	22.56mA	33.85mA	1.083mA	✓	✓	1.116mA	✓	N/A
30	None	None	0.142mA			0.166mA		N/A	31	21.11mA	31.66mA	1.255mA	✓	✓	1.276mA	✓	N/A
32	None	None	0.158mA			0.179mA		N/A	33	19.83mA	29.75mA	1.401mA	✓	✓	1.428mA	✓	N/A
34	None	None	0.160mA			0.179mA		N/A	35	18.70mA	28.04mA	1.248mA	✓	✓	1.277mA	✓	N/A
36	None	None	0.138mA			0.154mA		N/A	37	17.68mA	26.53mA	0.765mA	✓	✓	0.809mA	✓	N/A
38	None	None	0.152mA			0.175mA		N/A	39	16.78mA	25.17mA	0.573mA	✓	✓	0.606mA	✓	N/A
40	None	None	0.142mA			0.159mA		N/A									

<L1 : Reading is below limit 1.

<L2 : Reading is below limit 2.

N/A : Harmonic current below 0.6% of rated current or 5mA, whichever is greater, are disregarded.

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.4 Voltage fluctuation & Flicker

The EUT operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.
During the flicker measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes.

Limits of voltage fluctuations and flicker at the supply terminals

short-term flicker indicator, Pst	the relative steady-state voltage change, dc	the value of *d(t)* during a voltage change, d(t) >3.3 %	the maximum relative voltage change, dmax
1.0	**3.3 %**	**500 ms**	**4 %**

4.4.1 Test instrumentation

Test instrumentation used in the Voltage fluctuation & Flicker test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Power Analyzer	PM6000	Voltech	100006700167	2007-10-12	12
IEC Network	555	ZIMMER	IB10/9466	N/A	N/A
Test Software	IEC1000-3	Voltech	Ver 3.13.08	N/A	N/A

4.4.2 Photograph of the test Configuration

Is Same the Harmonic current test photograph.

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.4.3 Test results

Operating condition	PC Video In(Analog) / DVI Input(Digital) / DVI to HDMI connected			
Test date	2008-05-31	**Test engineer**	Hyun Jeong, Jang	
Climate condition	**Ambient temperature**	24.2 ℃	**Relative humidity**	40 %
	Atmospheric pressure	100.5 kPa		
Test place	Shielded Room #3			

Product:	MONITOR	2008 May 31 10:28am
Serial no:	None	Page 1 of 1
Description:		
Result Name:	FLI_PC	
Voltech IEC61000-3 Windows Software 1.08.03RC1		Test Date: 2008 May 31 9:06am
Type of Test:	Flickermeter Test - Table	
Power Analyzer:	Voltech PM6000 v1.18.05RC3 s/n 100006700167	
AC Source:	Mains / Manual Source	
Overall Result: **PASS**	Notes: Measurement method - Voltage	

	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)
Limit	1.000	3.300	4.000	500
Reading 1	0.101	0.003	0.058	0

Product:	MONITOR	2008 May 31 10:28am
Serial no:	None	Page 1 of 1
Description:		
Result Name:	FLI_DVI	
Voltech IEC61000-3 Windows Software 1.08.03RC1		Test Date: 2008 May 31 9:36am
Type of Test:	Flickermeter Test - Table	
Power Analyzer:	Voltech PM6000 v1.18.05RC3 s/n 100006700167	
AC Source:	Mains / Manual Source	
Overall Result: **PASS**	Notes: Measurement method - Voltage	

	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)
Limit	1.000	3.300	4.000	500
Reading 1	0.152	0.002	0.070	0

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

Product:	MONITOR	2008 May 31 10:28am
Serial no:	None	Page 1 of 1
Description:		
Result Name:	FLI_HDMI	
Voltech IEC61000-3 Windows Software 1.08.03RC1	Test Date:	2008 May 31 10:03am
Type of Test:	Flickermeter Test - Table	
Power Analyzer:	Voltech PM6000 v1.18.05RC3 s/n 100006700167	
AC Source:	Mains / Manual Source	
Overall Result: **PASS**	Notes: Measurement method - Voltage	

	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)
Limit	1.000	3.300	4.000	500
Reading 1	0.086	0.002	0.085	0

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

Operating condition	Manual Switching			
Test date	2008-05-31	**Test engineer**	Hyun Jeong, Jang	
Climate condition	**Ambient temperature**	24.2 ℃	**Relative humidity**	40 %
	Atmospheric pressure	100.5 kPa		
Test place	Shielded Room #3			

Product:	MONITOR	2008 May 31 11:32am
Serial no:	None	Page 1 of 1
Description:		
Result Name:	MANUAL SWITCHING	
Voltech IEC61000-3 Windows Software 1.08.03RC1		Test Date: 2008 May 31 10:58am
Type of Test:	Manual Switching - Table	
Power Analyzer:	Voltech PM6000 v1.18.05RC3 s/n 100006700167	
AC Source:	Mains / Manual Source	
Overall Result: **PASS**	Notes: Measurement method - Voltage	

Average dmax	1.429
dmax limit	4

Result	dc	dt > dc	dmax	dmax pass / fail	included
1	0.107	0.000	2.002	Pass	✓
2	0.105	0.000	1.651	Pass	✓
3	0.105	0.000	1.889	Pass	✓
4	0.107	0.000	0.961	Pass	✓
5	0.105	0.000	0.941	Pass	✓
6	0.107	0.000	1.064	Pass	✓
7	0.104	0.000	0.650	Pass	✓
8	0.105	0.000	1.880	Pass	✓
9	0.107	0.000	2.220	Pass	✓
10	0.104	0.000	1.624	Pass	✓
11	0.107	0.000	1.874	Pass	✓
12	0.107	0.000	1.526	Pass	✓
13	0.105	0.000	0.992	Pass	✓
14	0.105	0.000	1.003	Pass	✓
15	0.107	0.000	1.036	Pass	✓
16	0.107	0.000	1.991	Pass	✓
17	0.107	0.000	0.551	Pass	✗
18	0.105	0.000	1.642	Pass	✓
19	0.107	0.000	0.868	Pass	✓
20	0.107	0.000	1.073	Pass	✓
21	0.107	0.000	1.235	Pass	✓
22	0.105	0.000	2.019	Pass	✓
23	0.107	0.000	1.289	Pass	✓
24	0.105	0.000	2.367	Pass	✗

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.5 Electrostatic discharge

Contact discharges to the conductive surfaces and coupling planes:

The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points are subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane.
The remaining three test points are each receive at least 50 direct contact discharges.

If no direct contact test points are available, then at least 200 indirect discharges be applied in the indirect mode. Test is performed at a maximum repetition rate of one discharge per second.

Air discharges at slots and apertures and insulating surfaces:

On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur.
Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user.

A minimum of 10 single air discharges shall be applied to the selected test point for each such area. The EUT was tested with all I/O ports exercised. Test results are listed below.
The basic test procedure was in accordance with IEC 61000-4-2.

Performance criteria

Application of discharge	Test specification (kV)	Performance criteria
Contact discharge	**4**	**B**
Air Discharge	**8**	**B**

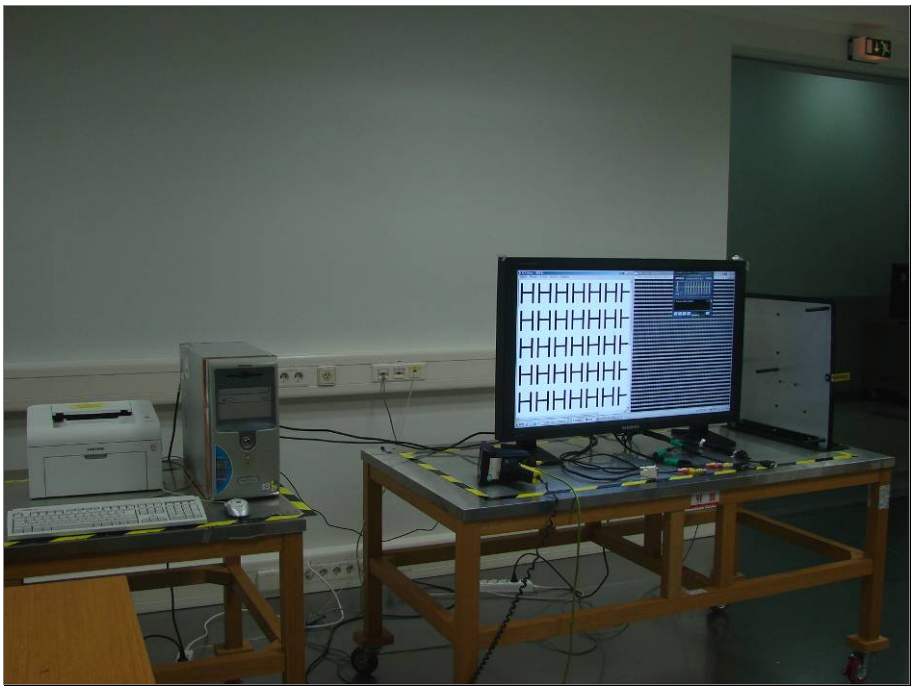
4.5.1 Test instrumentation

Test instrumentation used in the Electrostatic discharge test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
ESD Gun	NSG435	SCHAFFNER	001506	2008-03-27	12
Vertical Plane	VCP-1	Thermo Keytek	-	-	-

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.5.2 Photograph of the test Configuration



This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.5.3 Test results

Operating condition	PC Video In(Analog)			
Test date	2008-06-08	**Test engineer**	Hyun Jeong, Jang	
Climate condition	**Ambient temperature**	24.0 ℃	**Relative humidity**	56 %
	Atmospheric pressure	100.5 kPa		
Test place	Shielded Room #3			

Test Method	No	Applied Point	Discharge Method	Test Level(KV)	Observation [Note No.]	Performance Result
Indirect	-	HCP	Contact	±2☒ ±4☒ ±8☐	**Note 1**☒ **2**☐	A☒ B☐ C☐
		VCP	Contact	±2☒ ±4☒ ±8☐	**Note 1**☒ **2**☐	A☒ B☐ C☐
Direct	1	LCD Panel	Air	±2☒ ±4☒ ±8☒	**Note 1**☒ **2**☐	A☒ B☐ C☐
	2	RS232C Out/In	Air Contact	±2☒ ±4☒ ±8☒ ±2☒ ±4☒ ±8☐	**Note 1**☒ **2**☐ **Note 1**☒ **2**☐	A☒ B☐ C☐ A☒ B☐ C☐
	3	Audio	Air Contact	±2☒ ±4☒ ±8☒ ±2☒ ±4☒ ±8☐	**Note 1**☒ **2**☐ **Note 1**☒ **2**☐	A☒ B☐ C☐ A☒ B☐ C☐
	4	HDMI	Air Contact	±2☒ ±4☒ ±8☒ ±2☒ ±4☒ ±8☐	**Note 1**☒ **2**☐ **Note 1**☒ **2**☐	A☒ B☐ C☐ A☒ B☐ C☐
	5	PC Video In	Air Contact	±2☒ ±4☒ ±8☒ ±2☒ ±4☒ ±8☐	**Note 1**☒ **2**☐ **Note 1**☒ **2**☐	A☒ B☐ C☐ A☒ B☐ C☐
	6	DVI Input	Air Contact	±2☒ ±4☒ ±8☒ ±2☒ ±4☒ ±8☐	**Note 1**☒ **2**☐ **Note 1**☒ **2**☐	A☒ B☐ C☐ A☒ B☐ C☐
	7	Audio In/Out	Contact	±2☒ ±4☒ ±8☐	**Note 1**☒ **2**☐	A☒ B☐ C☐
	8	Switch	Air	±2☒ ±4☒ ±8☒	**Note 1**☒ **2**☐	A☒ B☐ C☐
	9	AC Power	Air	±2☒ ±4☒ ±8☒	**Note 1**☒ **2**☐	A☒ B☐ C☐

NOTE
1. There was no change compared with initial operation during the test.
2. While the electrostatic discharge tests, malfunction appeared in normal operate, but self-recoverable after the test.

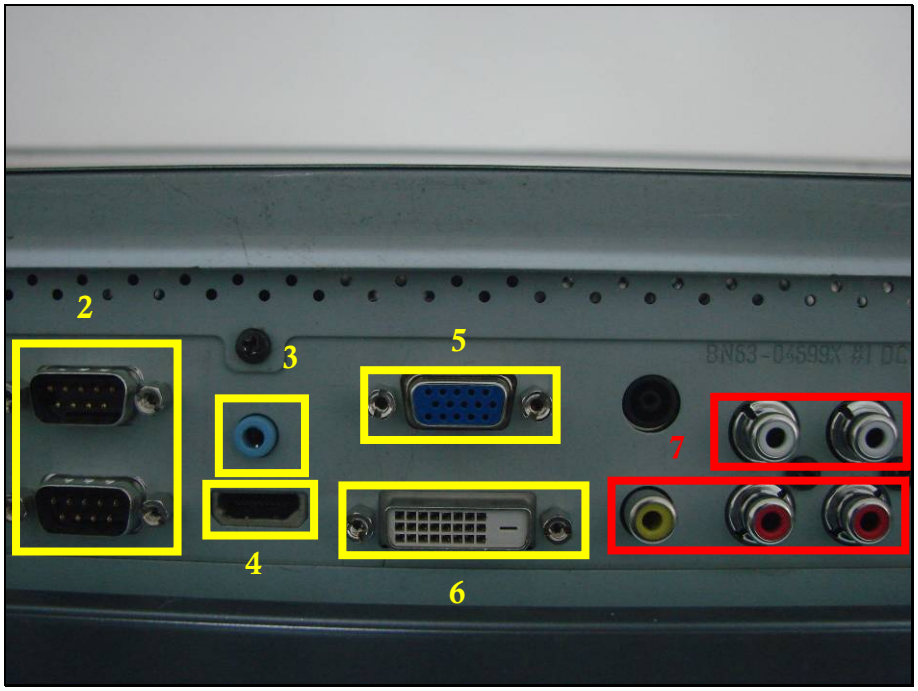
This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.5.4 Tested points

Air discharge points	Contact discharge points	Air/Contact discharge points

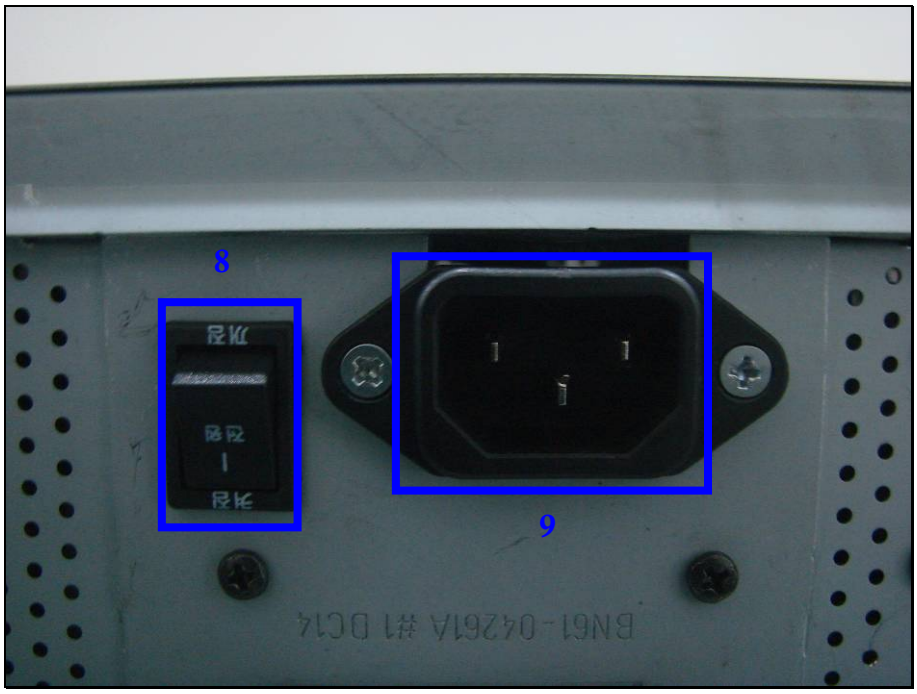
■ **Front**

■ **Side**



This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

■ Buttom



This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.6 Radiated, radio-frequency, electromagnetic field

The test was performed with the EUT exposed to both vertically and horizontally polarized fields. on each of the four sides.
The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond. The basic test procedure was in accordance with IEC 61000-4-3.

Performance criteria

Test range [MHz]	Test specification	Performance criteria	Remarks
80 ~ 1000	**3 V/m(unmodulated, r.m.s) 80 % AM(1 kHz)**	**A**	The test level specified is prior to modulation See *)
*) The frequency range is scanned as specified. However, when specified in Annex A, EN55024, an additional comprehensive functional test shall be carried out at a limited number of frequencies. The selected frequencies are: 80, 120, 160, 230, 434, 460, 600, 863 and 900 MHz (±1 %).			

4.6.1 Test conditions

Test condition in the Radiated, radio-frequency, and electromagnetic field test was as follows:

1. Representative operating conditions of EUT	☒ PC Video In(Analog)	
2. Type of the EUT	☒ **Table-top**	☐ **a combination of the two**
	☐ **Floor-standing**	**a height above the ground plane;** ☐ **0.1 m** ☐ **0.8 m**
3. Type of test facility	3m Fully anechoic chamber	
4. Position of the radiating antennas	a distance of 3 meters from the EUT	
5. Type of antennas	Log-periodic	
6. Frequency sweep rate	1.5 x 10-3 decades/s	
7. Dwell time and frequency steps	Dwell time : 3 s, Step size : 1 %	
8. Applied test level	3 V/m	

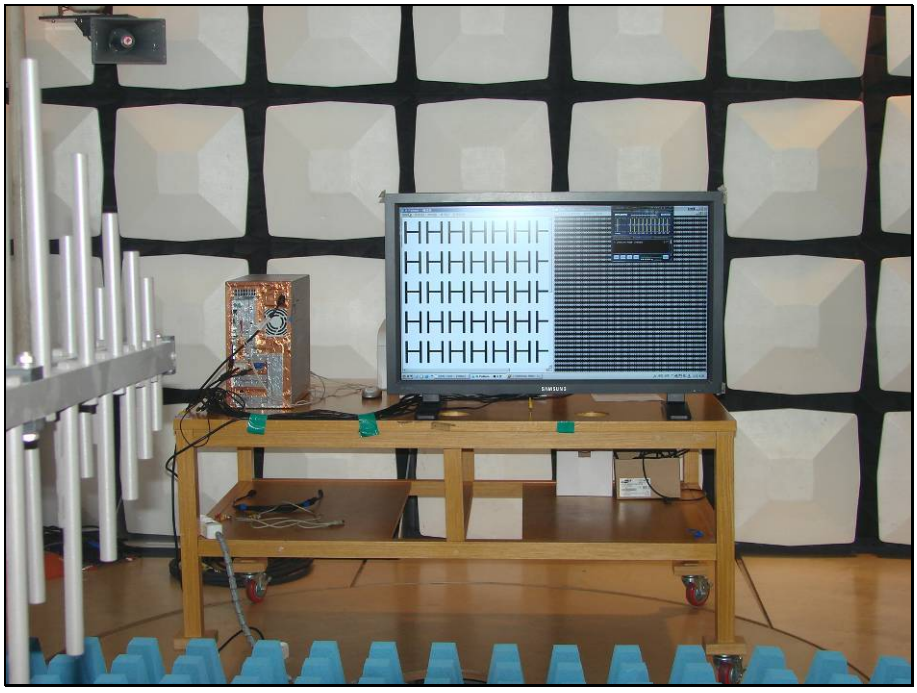
This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.6.2 Test instrumentation

Test instrumentation used in the Radiated, radio-frequency, and electromagnetic field test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				date	Interval
Mast Controller	CO2000	INNCO	-	N/A	-
Sinal Generator	SML03	R&S	102191	2007-09-07	12
Milivolt Meter	URV5	R&S	100243	2008-04-07	12
10V Insertion Unit	URV5-Z2	R&S	100240	2008-04-07	12
10V Insertion Unit	URV5-Z2	R&S	100241	2008-04-07	12
Amplifier	250W1000A	AR	312241	N/A	N/A
Amplifier	60SIG3	AR	311853	N/A	N/A
Antenna	AT1080	AR	310700	N/A	N/A
Antenna Mast	TP1000A	AR	311200	N/A	N/A
Relay Switching Unit	TS-RSP	AR	-	N/A	N/A

4.6.2 Photograph of the test Configuration



This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.6.3 Test results

Test date	2008-06-08	Test engineer	Hyun Jeong, Jang
Climate condition	Ambient temperature	21.0 ℃	Relative humidity 42 %
	Atmospheric pressure	100.5 kPa	

Frequency [MHz]	Table Azimuth [degree]	Polarity	Observation	Performance Result
80 ~ 1 000	0	Horizontal	See Note	A ☒ B ☐
		Vertical		A ☒ B ☐
	90	Horizontal		A ☒ B ☐
		Vertical		A ☒ B ☐
	180	Horizontal		A ☒ B ☐
		Vertical		A ☒ B ☐
	270	Horizontal		A ☒ B ☐
		Vertical		A ☒ B ☐

NOTE: There was no change compared with initial operation during the test.

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.7 Electrical fast transient/burst

■ Test on power supply ports and on protective earth terminals

Stationary, floor-mounted equipment

The test voltage applied between a reference ground plane and each of the power supply terminals, a.c. or d.c., and on the terminal for the protective or function earth on the cabinet of the EUT.
The EFT/B-generator shall be located on the reference plane.
The length of the “hot wire” from the coaxial output of the EFT/B-generator to the terminals on the EUT is not exceeding 1 m. This connection was unshielded but well insulated.
All other connections of the EUT are in accordance with its functional requirements.

Non-stationary mounted EUT, connected to the mains supply by flexible cord and plugs

The test voltage is applied between each of the power supply conductors and the protective earth at the power supply outlet to which the EUT is to be connected.

■ Test on I/O and communication ports

As far as possible, the capacitive coupling clamp is used for coupling the test voltage into the lines. However, if the clamp cannot be used due to mechanical problems (size, cable routing) in the cabling, it may be replaced by a tape or a conductive foil enveloping the lines under test. The capacitance of this coupling arrangement with foil or tape is equivalent to that of the standard coupling clamp.

In other cases, it is useful to couple the EFT/B-generator to the terminals of the lines via discrete 100 pF capacitors instead of the distributed capacitance of the clamp or of the foil or tape arrangement.

All tests carried out in shielded room.
The EUT was tested with all I/O ports exercised. Test results are listed below.

Performance criteria

Applied conditions	Test specification	Performance criteria
Open-circuit output test voltage		**B**
a.c. power ports	**1 kV(Peak)**	
signal and telecommunication ports	**0.5 kV(Peak)**	
d.c. power ports	**0.5 kV(Peak)**	
Wave shape of the pulse	**5/50 Tr/Th ns**	
Repetition Frequency	**5 kHz**	

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.7.1 Test conditions

Test condition in the Electrical fast transient/burst immunity test was as follows:

1. Representative operating conditions of the EUT		☒ PC Video In(Analog)
2. the Type of the EUT	☐ **Stationary, floor-mounted equipment**	
	☒ **Non-stationary mounted EUT**	
3. the type of test facility		Shielded Room #2
4. Test level		☐ **0.5 kV** ☒ **1 kV**
5. Polarity of the test voltage		☒ **Positive** ☒ **Negative**
6. Duration of the test		18 min
7. EUT's ports to be tested	**a.c. power ports**	☒ **Live** ☒ **Neutral** ☒ **Live + Neutral** ☒ **Live + PE** ☒ **Neutral + PE** ☒ **Live + Neutral + PE**
	Others ports	☐ **I/O ports** ☐ **Communication ports** ☐ **d.c. power ports**

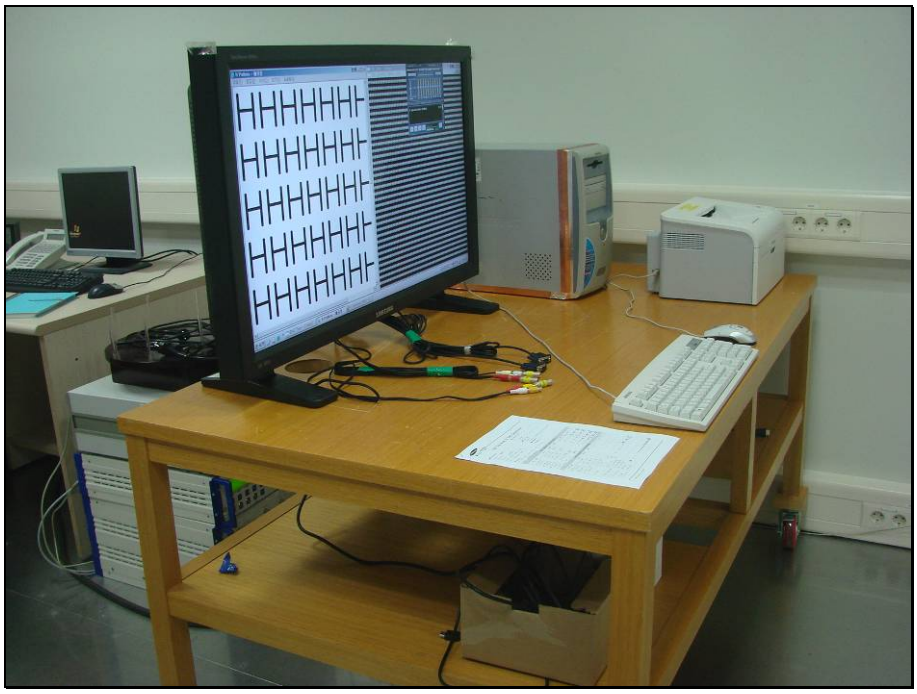
4.7.2 Test instrumentation

Test instrumentation used in the Electrical fast transient/burst test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
EFT/Burst Generator	NSG 2025	SCHAFFNER	19873	2007-09-06	12
CDN	CDN 8015	SCHAFFNER	19073	N/A	N/A

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.7.3 Photograph of the test Configuration



This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.7.4 Test results

Test date	2008-06-05	Test engineer	Hyun Jeong, Jang
Climate condition	Ambient temperature	25.0 ℃	Relative humidity 48 %
	Atmospheric pressure	100.7 kPa	

Test Point		Polarity	Test Level (kV)	Tr/Th [ns]	Observation [Note No.]	Performance Result
a.c. power ports	Live	+/-	1	5/50ns, 5kHz	Note 1☒ 2☐	A ☒ B ☐
	Neutral	+/-	1	5/50ns, 5kHz	Note 1☒ 2☐	A ☒ B ☐
	PE (Ground)	+/-	1	5/50ns, 5kHz	Note 1☒ 2☐	A ☒ B ☐
	Live + PE	+/-	1	5/50ns, 5kHz	Note 1☒ 2☐	A ☒ B ☐
	Neutral + PE	+/-	1	5/50ns, 5kHz	Note 1☒ 2☐	A ☒ B ☐
	Live + Neutral	+/-	1	5/50ns, 5kHz	Note 1☒ 2☐	A ☒ B ☐
	Live + Neutral + PE	+/-	1	5/50ns, 5kHz	Note 1☒ 2☐	A ☒ B ☐
LAN Ports		+/-	0.5	5/50ns, 5kHz	Note 1☐ 2☐	A ☐ B ☐

NOTE
1. There was no change compared with initial operation during the test.
2. The transmission of data was stopped during the test, but self-recoverable after the test.

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.8 Surge

The basic test procedure was in accordance with IEC 61000-4-5.

Performance criteria

Applied conditions	Test specification	Performance criteria
Combination wave **a.c. power ports** **signal and telecommunication ports** **d.c. power ports**	**Line to Line 1 kV(Peak)** ① **Line to earth 2 kV(Peak)** ① **Line to ground 1 kV(Peak)** ② **0.5 kV(Peak)** ③	**B**
Waveform parameter **Open-circuit voltage** **Short-circuit current**	**1.2/50 Tr/Th μs** **8/20 Tr/Th μs**	

① Applicable only to ports which according to the manufacturer's specification may connect directly to outdoor cables. Where normal functioning cannot be achieved because of the impact of the CDN on the EUT, no test shall be required.
② When the manufacturer specifies protection measures and it is impractical to simulate these measures during the tests, then the applied test levels shall be reduced to 0,5 kV and 1 kV.
③ Applicable only to ports which according to the manufacturer's specification may connect directly to outdoor cables.

4.8.1 Test instrumentation

Test instrumentation used in the Surge test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Surge Tester	PSURGE 8000	HAEFELY	152602	2008-01-30	12
Surge Impulse Module	PIM 100	HAEFELY	152288	2008-01-23	12
Coupling Decoupling Network	PCD 120	HAEFELY	148918	2008-01-23	12
Coupling Decoupling Network	FP-SURGE 100M	HAEFELY	152636	2008-01-23	12
Impulse Module	PIM 120	HAEFELY	150663	2008-01-30	12

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

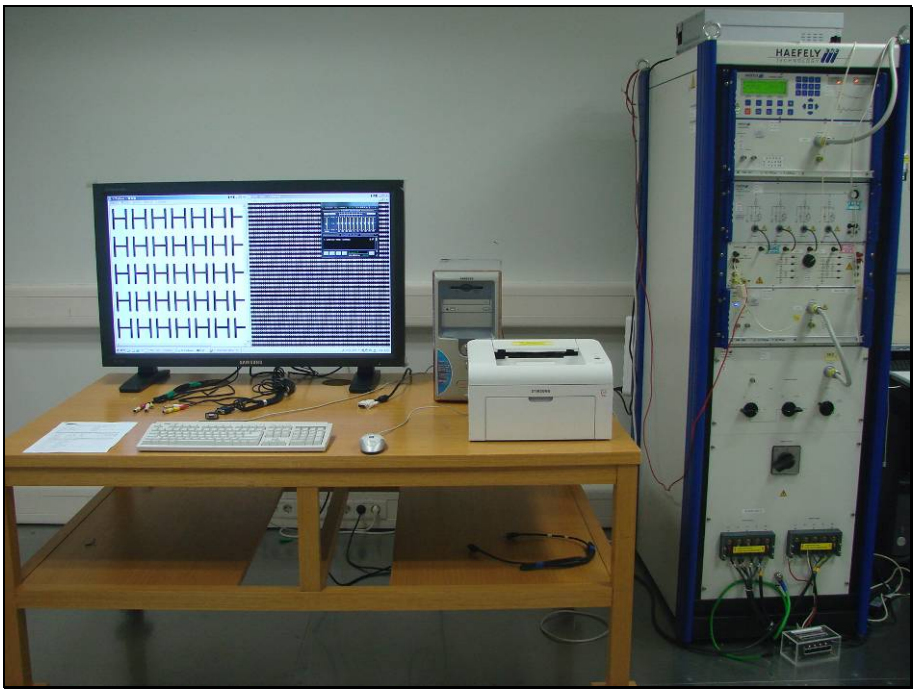
4.8.2 Test conditions

Test condition in the Surge immunity test was as follows:

1. Representative operating conditions of the EUT		☒ PC Video In(Analog)
2. Type of LINE	☒ **EUT power supply**	
	☐ **unshielded asymmetrically operated interconnection lines**	
	☐ **unshielded symmetrically operated interconnection / telecommunication lines**	
	☐ **shielded lines**	
	☐ **potential differences**	
3. the type of test facility		Shielded Room #3
4. Test level		☐ **0.5 kV** ☒ **1 kV** ☒ **2 kV**
5. Polarity of the surge		☒ **Positive** ☒ **Negative**
6. Number of test(at selected points)		40
7. Repetition rate		60 **sec**
8. EUT's ports to be tested	**a.c. power ports**	☒ **Live + Neutral** ☒ **Live + PE** ☒ **Neutral + PE**
	others ports	☐ **I/O ports** ☐ **Communication ports** ☐ **d.c. power ports**

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.8.3 Photograph of the test Configuration



This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.8.4 Test results

Test date	2008-06-05	Test engineer	Hyun Jeong, Jang
Climate condition	Ambient temperature	24.0 ℃	Relative humidity 56 %
	Atmospheric pressure	100.1 kPa	

Test Point			Polarity	Test Level (kV)	Phase wave Shape [μs]	Observation [Note No.]	Performance Result
a.c. power ports	Live + PE		+/-	2	1.2/50(8/20)	Note 1☒ 2☐	A ☒ B ☐
	Neutral + PE		+/-	2	1.2/50(8/20)	Note 1☒ 2☐	A ☒ B ☐
	Live + Neutral		+/-	1	1.2/50(8/20)	Note 1☒ 2☐	A ☒ B ☐
I/O Ports		Line to Earth	+/-	1	1.2/50(8/20)	Note 1☐ 2☐	A ☐ B ☐
LAN Ports			+/-	1	1.2/50(8/20)	Note 1☐ 2☐	A ☐ B ☐
Modem Ports			+/-	1	1.2/50(8/20)	Note 1☐ 2☐	A ☐ B ☐
d.c. power ports			+/-	0.5	1.2/50(8/20)	Note 1☐ 2☐	A ☐ B ☐

NOTE

1. There was no change compared with initial operation during the test.

2. The transmission of data was stopped during the test, but self-recoverable after the test.

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.9 Conducted disturbances, induced by radio-frequency fields

The test was performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.

Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility. Test results are listed below.
The basic test procedure was in accordance with IEC 61000-4-6.

Performance criteria

Test range [MHz]	Test specification	Performance criteria	Remarks
0.15 ~ 80	**3 V(unmodulated, r.m.s) 80 % AM(1 kHz)**	**A**	See 1), 2)

1) The frequency range is scanned as specified. However, when specified in Annex A, an additional comprehensive functional test shall be carried out at a limited number of frequencies. The selected frequencies for conducted tests are: 0,2; 1; 7,1; 13,56; 21; 27,12 and 40,68 MHz (±1 %).
2) Applicable only to cables which according to the manufacturer's specification supports communication on cable lengths greater than 3m.

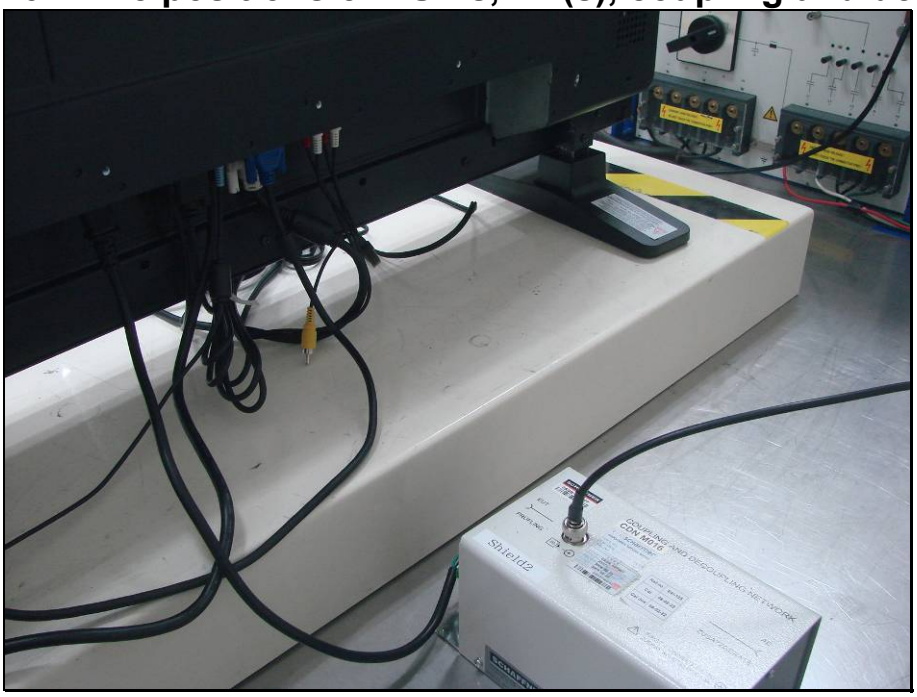
4.9.1 Test conditions

Test condition in the Radiated, radio-frequency, and electromagnetic field test was as follows:

1. Representative operating conditions of EUT		☒ PC Video In(Analog)
2. Type of EUT' unit	☒ **Single**	☐ **Multiple**
3. Type of test facility used		Shielded Room #2
4. Frequency range of application the test		0.15 ~ 80 MHz
5. Frequency sweep rate		1.5 x 10-3 decades/s
6. Dwell time and frequency steps		Dwell time : 3 s, Step size : 1 %
7. Applied test level		3 V

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.9.2 The positions of EUT's, AE(s), coupling and decoupling device



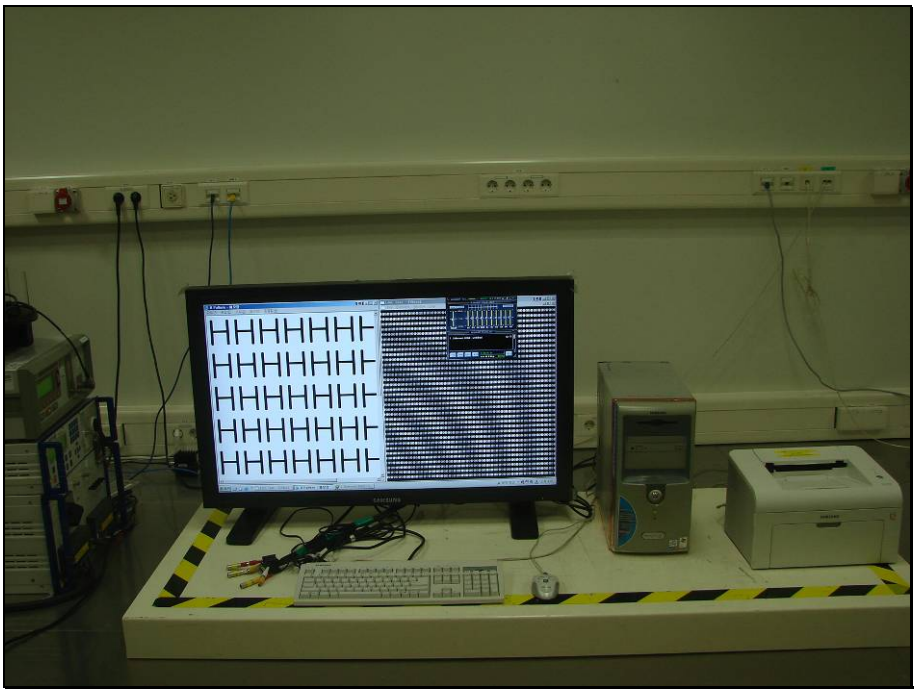
4.9.3 Test instrumentation

Test instrumentation used in the Conducted disturbances, induced by radio-frequency fields test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				date	Interval (Month)
RF - Generator	NSG2070	Schaffner	1118	2008-06-16	12
Attenuator	INA2070-1	Schaffner	2118	2008-03-06	12
Test Software	Win 2070	Schaffner	V01.05	N/A	N/A
Coupling Decoupling Network	CDN M016	Schaffner	21246	2008-04-21	12

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.9.4 Photograph of the test Configuration



This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.9.5 Test results

Test date	2008-06-05	Test engineer	Hyun Jeong, Jang
Climate condition	Ambient temperature	23.7 ℃	Relative humidity 51 %
	Atmospheric pressure	100.3 kPa	

Frequency (MHz)	Field Strength (Vr.m.s.)	Injection Method	Inject Points (Cable length)	Observation [Note No.]	Performance Result
0.15 ~ 80	3	CDN-M3	AC power line(1.8m)	Note 1☒ 2☐	A ☒ B ☐
	3	CDN-T4	LAN (10m)	Note 1☐ 2☐	A ☐ B ☐
	3	CDN-T2	Telephone (10m)	Note 1☐ 2☐	A ☐ B ☐
	3	CLAMP	DC (1.8m)	Note 1☐ 2☐	A ☐ B ☐
	3	CLAMP	Printer (2m)	Note 1☐ 2☐	A ☐ B ☐
	3	CLAMP	VGA (1.8m)	Note 1☐ 2☐	A ☐ B ☐

NOTE

1. There was no change compared with initial operation during the test.
2. The transmission of data from modem port stopped during the test, but self-recoverable after the test. This permissive loss of performance is specified by the manufacturer, and this phenomenon will be put as a clear statement in the User's Manual to avoid misunderstanding.

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.10 Voltage dips, short interruptions and voltage variations

The EUT is tested for each selected combination of test levels and duration with a sequence of tree dips/interruptions with intervals of 10 s minimum (between each test event).
Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform. The basic test procedure was in accordance with IEC 61000-4-11.

Performance criteria

Environmental phenomenon	Test specification	Units	Performance criteria	Remarks
Voltage dips	>95 0,5	% reduction periods	B	See NOTE
	30 25		C	
Voltage interruptions	>95 250		C	
[NOTE] Changes to occur at 0 degree crossover point of the voltage waveform.				

4.10.1 Test instrumentation

Test instrumentation used in the Voltage dips, short interruptions and voltage variations test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				date	Interval (Month)
Voltage Dip & Interruption	☐ PFS 503	EM TEST	PFS503/63A -0513100236	2007-06-16	12
	☒ PLINE 1610	HAEFELY	083690-21	2008-05-13	12

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.10.2 Photograph of the test Configuration

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

4.10.3 Test results

Operating condition	PC Video In(Analog)			
Test date	2008-05-29	Test engineer	Hyun Jeong, Jang	
Climate condition	Ambient temperature	25.0℃	Relative humidity	48%
	Atmospheric pressure	100.7kPa		

Test Voltage	Period	Number of Applications	Angle [Degrees]	Observation [Note No.]	Performance Result
>95 % UT	0.5	10	0, 180	Note 1☒ 2☐	A ☒ B ☐ C ☐
30 % UT	25	10	0	Note 1☒ 2☐	A ☒ B ☐ C ☐
>95 % UT	250	10	0	Note 1☐ 2☒	A ☐ B ☒ C ☐

NOTE

1. There was no change compared with initial operation during the test.

2. While The Voltage Dip & Interruption tests, malfunction appeared in normal operate, but self-recoverable after the test.

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

Appendix – EUT photography

Front View

Rear View

This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.